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Catapult Launching of Vought Seaplane from U.S.S. Maryland

VOLUME XIII
Number 9

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SPECIAL FEATURES

ORGANIZATION AND FUNCTION OF NAVAL AVIATION
NAVY OPPOSES SINGLE AIR FORCE
THE BRITISH NAVY AND AVIATION
U. S. NAVAL AIRSHIP ZR1
AIR LEGISLATION ONE HUNDRED YEARS AGO

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

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CONTENTS

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The Bureau of Aeronautics

THE comprehensive statement regarding the Bureau of Aeronautics of the Navy Department by Admiral Moffett in this issue gives a clear outline of the work of this new branch of the Navy

The formation of an agency within the Navy Department to concentrate on aeronautics and to have centered in one group all air activities was a wise move. It was long urged by those whose belief in the utilization of air power by the Navy had been retarded by the scattering of responsibility for aerial development among the various bureaus. Now that the organization of the Bureau has been completed and is functioning, it is timely to have its duties and objectives so clearly outlined.

As will be seen, the Bureau is thoroughly awake to the imperative need of aircraft both with the fleet and on shore. The shore development has been a comparatively easy matter Here no old prejudices or mechanical limitations were encountered Flying fields, training stations and experimental factories could be started without interfering with the Navy routine It has been a greater problem to demonstrate that aircraft afloat render a practical and efficient service.

The natural hesitancy of naval officers to place reliance on new devices is based on long experience Perhaps those interested in a broad utilization of aircraft have been impatient with the reticence shown in the Navy to use airplanes to their ultimate power The bombing tests last year were perhaps more responsible for the awakening of the Navy to an appreciation as to the possibilities of bombs than any other influence There is no argument so strong as a practical and successful test.

In the absence of aircraft carriers, some method of using heavier-than-air and lighter-than-air-ships with the fleet had to be devised The catapult has been developed to a point where it is a success. This achievement has been one of the noteworthy advances made by the Bureau for while the idea has been in work for several years, its practical application has only been brought about in the last year

The production of types of aircraft suitable for Naval use has progressed to a point where the Navy now has airplanes which can be used as a basis of future design The Pulitzer Race in Detroit will give the public an opportunity to learn more as to the speed and performance of these naval aircraft.

In lighter-than-air, the Bureau has a building program that will give the United States the beginning of a dirigible fleet which can demonstrate the usefulness of these craft. The big ZR1 now under construction at Lakehurst and the ZR3 from Germany will give the United States an opportunity to learn the comparative merits of the two latest types of big dirigibles.

Admiral Moffett's ability as an organizer and his belief in the necessity of the Navy having air protection has brought great credit to the Bureau of which he is chief

Soaring for Two Hours

WHILE it is too early to comment in a technical way on the remarkable performance of the German student Hentzen who remained in the air for over two hours in a motorless glider, the feat is so important that the entire aviation world will be eager to learn more of the details.

That the students of the Hanover Technical School have made a great contribution to the science of flying is evident. Soaring flight and hovering have long been the goal of many experimenters And had the success come to one of the recognized designers the astonishment would not have been as great. But the building of gliders and gliding appears to be easily within the reach of younger students of aviation.

A word of caution regarding the difficulties of glider experimentation may be timely A glider is perhaps the most difficult of all aircraft to fly owing to its lack of power in emergencies. The impression should not prevail that glider flight is easier than power flight. It not only requires all the skill of an airplane pilot but a great knowledge of the air currents as well.

Two hours in the air without power! And this following a remarkable flight of sixty-six minutes by another student shows that the record is not a freak performance Rising several hundred feet above his starting point Hentzen hovered on the gusts of a slight breeze until he had passed the two hour period by ten seconds Without a doubt their flights mark a new epoch in aviation.

Detroit in October

EVERYONE with any interest in heavier-than-air aviation will find Detroit the most interesting place in the world in early October The contests and the convention promise to make aviation history.

The Army and the Navy are entering aircraft of every type that come within the scope of the meet and the results will probably give the world new records in speed and endurance.

The Second National Aero Congress will organize the country into a powerful aerial association with influential local representation That such an organization has been needed has been recognized for a long time. The Aero Club of America while performing the function of a national body was too limited in its scope to attract country wide support. With an aviation congress as a fixed yearly point of contact a new spirit of enthusiastic aviation cooperation will pervade the whole country

The arrangements that have been made by the Detroit Aviation Society are being perfected so that all visitors will find their time fully occupied with aviation. Such an undertaking requires great effort in preliminary organization but with the aid of all interests, Detroit will make this occasion rank with the early Belmont Park and Chicago meets.

Organization and Function of Naval Aviation

First Thorough Survey of the Work and Duties of the Bureau of Aeronautics

By Rear Admiral W. A. Moffett, U.S.N.

Chief, Bureau of Aeronautics

A new conception of Naval Aviation has come into being within the past three years, born of the lessons taught by naval operations in the world war. At the time the United States entered the war this branch of the naval service was just emerging from the experimental stage into the realm of practical application. It was recognized that aircraft would prove an invaluable asset to the Navy, and the Navy was not laggard in making provisions for its proper development. And so at the outbreak of war an immense program for naval aircraft development gained momentum and was soon keeping apace with the progress of the national emergency.

But at this time and in the ensuing wartime period the activities of aircraft in the naval operations did not extend beyond, what today may be termed, elementary uses. Patrol and scouting was allotted to the Naval plane and was carried out, in so far as this could be accomplished, from land bases. This program was largely due to the nature of the work to be accomplished. The submarine patrol was work for which the airplane and lighter-than-air craft were peculiarly adapted and development of naval aircraft progressed along lines which would best serve the ends of anti-submarine operations. The possibilities of a more extended field of usefulness for naval aircraft had been visioned prior to the war and the first steps were taken toward developing means for rendering the airplane an integral part of the fleet by experiments with launching devices constructed on the decks of cruisers. But this activity was cut short by the more immediate necessity for combating the submarine menace. And in meeting this situation Naval Aviation gave every evidence of the vigorous initiative that has characterized its development down to the present day. The fact is not generally known that thirty-one separate Naval Air Stations were established, maintained and operated by the Navy overseas during the war. These stations were scattered through Great Britain, France, Italy and the Azores and the work that was accomplished from them had a direct bearing on the successful outcome of the war. Sufficient support of this statement is found in the fact that after the establishment of U S Naval Air Bases in France not a single convoy, escorted by aircraft, was successfully attacked by German submarines on the Western coast of France.

The close of the war released aviation from the exigencies of immediate demands and enabled it to expand along lines that had come to be recognized as vital to the naval establishment. This expansion was based upon a necessity as vital if not as immediate as were the consideration having to do with the submarine peril. Heretofore the command of the sea hinged upon a preponderance of force, surface and subsurface in character, but the injection of a new element, command of the air, called for an altered policy. The value of aircraft for purposes of attack, information and defense demanded a further incorporation of this branch of naval activities into the battlefleet.

Rear Admiral W A Moffett

With the demonstration of the value of airplanes to the fleet and the development of new and varied uses for craft of different characteristics, naval aviation has arrived at a point where the healthy offspring of the Navy must assume the new responsibilities of maturity.

On Sept 1, 1921, the Bureau of Aeronautics of the Navy Department began to function, pursuant to a general order issued by the Secretary of the Navy and in conformity with the provisions of legislation enacted by Congress. The creation of a separate Bureau for the control and direction of naval aeronautics gave an increased impetus to aviation in the Navy which is best exemplified by the work of the past year. Until the bureau was brought into existence aviation interests were scattered widely throughout the department and were only subject to the general supervision of a directorship under Naval Operations. The organization of the Bureau which was put into effect upon its creation, placed at the head a Chief of Bureau charged with the general supervision of Naval Aviation and responsible to the Navy Department for all portions of the bureau's work. An assistant chief of bureau was also provided. His duties were prescribed as the principal adviser of the chief and general inspector of naval aviation activities.

The Bureau of Aeronautics is divided into four main divisions each with definitely prescribed duties and functions. They are: The Plans Division, the Administration Division, the Material Division and the Flight Division. At the head of each division stands the ranking officer in it, who carries out the plans and policies of the Chief of the Bureau and makes recommendations to him concerning matters that may come under his cognizance. The co-ordination of activities requiring interdependent action by two or more divisions in the bureau is accomplished by an executive aid to the Chief of Bureau.

The Plans Division as the name implies is the planning section of the organization and as such works in close liaison with the Material Division. The military characteristics of all types of planes and the types of all special appliances come under the supervision of this unit in the organization. This division makes recommendations to the Chief of Bureau on the subject of all new construction and upon approval by the chief cooperates with the Material Division in the preparation of sketches, models, exhibits, and data for submission to the General Board of the Navy.

As regards existing types of planes in service the Plans Division has cognizance of all shortcomings of Naval aircraft and special appliances and devices and makes recommendations as to the relative urgency of development work looking to the improvement in types of aircraft and military characteristics that are unsatisfactory.

The numbers of new aircraft needed, the rate of production required and the scope of new construction at shore stations comes within the province of this division as does also recommendations concerning the organization of aircraft units afloat. The final trials of aircraft to determine their suitability for naval service and the keeping of records of all military inspections made by the Bureau are also functions of the Plans Division.

In other words the Plans Division takes the aircraft over from producers, places them in the operating units after conducting final inspections and tests and plans the program of future work that they are designed to accomplish.

Administrative Division

The Administrative Division of the Bureau has general supervision over financial and legal affairs, including the compilation of recommendations for estimates of appropriations and recommendations for allotments of all funds under the control of the bureau. It also has under charge the collection and dissemination of all aeronautical information and the authorized activities of the bureau concerning legislation. This division administers the internal organization, has charge of office assignment and management, supervises its inter-Departmental and inter-Bureau administrative affairs and makes recommendation on all other matters of aeronautical administration.

Material Division

The Material Division covers the wide field of design and construction and has supervision over all material within the cognizance of the bureau that is used in connection with aeronautics. It is subdivided into sections which handle various features of this work and is so organized that it may direct and facilitate the production of advanced appliances and types of planes which are adapted to naval usage. The division includes a design section, and under this heading comes the lighter-than-air, the heavier-than-air and the engine subdivisions. A maintenance section is responsible for the equipment, operating requirements, supply and distribution for naval aviation.

The lighter-than-air section has charge of the work of developing and constructing all Navy balloons and rigid and semi-rigid airships. In the engine section all improvements and redesign of existing types of aircraft engines are handled and all new designs are here planned or encouraged. This latter group is assigned the task of initiating and supervising in general and in detail, all engine and propeller design, all electric wiring, storage batteries, lighting and starting, fuel investigations and fuel systems, reduction, reversing and transmission gear, radiator and cooling system design, and the dissemination to the service of technical and operating information and instructions.

As a service to all branches of the Material Division the scientific section renders invaluable aid. The scientific group is an association of technical personnel subdivided so that specialist knowledge may be applied to any problem which is presented. In this capacity it serves all sections of the division through an executive head who establishes co-operation with the other divisions of the bureau which may be in need of technical and scientific services.

Finally a technical information section is engaged in assembling, classifying and filing all manner of technical data that is of value for purposes of record. Through this department is routed all magazines and papers that have a bearing on aeronautics and it is the work of the section to see that such information reaches the personnel in the bureau who are most concerned.

In general, the Material Division of the bureau has control of the production and procurement of aircraft and accessories, the maintenance, repair, and salvage of aircraft, the compilation of information, the study of war-time production, and the upkeep and operation of aircraft factories and experimental stations.

Flight Division

The fourth division of the bureau mentioned—Flight—has charge of the training of personnel, the details of officers, and enlisted men to duty, the preparation of recommendations on all matters of aeronautical operation including the air operations required for the development of air tactics, safety rules, and precautions, air, beach, field, and flying deck regulations. The Flight Division also has control of aerological, and aerial photographic activities.

One of the most important activities which center around the Bureau of Aeronautics is that which has to do with the development of communications. In this field, aeronautics, in the navy had the advantage of years of work along similar lines for surface ships. Naval Aircraft, however, furnished a field for the application of known methods, and for new development. The development of radio communication in naval planes is the work of a special section of the Bureau of Engineering in cooperation with the Bureau of Aeronautics, and as the result of the work carried on in these bureaus, radio communication by planes is now a matter of every day practice as dependable as is the functioning of the planes themselves. The radio telephone adapted to airplane use, the radio compass installed in naval planes and most recent of all, the "telotype" a radio aircraft typewriter which reproduces the printed message at the ground station are developments of the aircraft radio section which works in co-operation with the bureau.

The foregoing is a brief but comprehensive outline of the organization of the bureau which has been responsible for the control, direction, and development of naval aviation for the past year, and is now working to the end that the navy may be equipped with the very best in aircraft so essential to it.

Organization, however, is the mechanical instrument created to serve the force of personality and ability. Prior to the creation of such an organization there existed the same intensive interest in naval aviation that maintains today. Aviation activities were going ahead with leaps and bounds, but withal much of this work was ineffective, due to lack of co-ordination. The Bureau of Aeronautics gathered under one organization the available forces and resources in existence looking to the furtherance of naval aviation interests. And, furthermore, a more vital and significant fact should

Naval Aviation in Hands of Seamen

here be recorded. Naval aviation under the Bureau of Aeronautics is in the hands of seamen who have spent the first years of their training in dealing with the problems of the sea, and in learning the habits, customs, and needs of the Navy at sea. This knowledge is basic for the development of a service which is designed to complement the fleet and the naval establishment. The interdependence of surface craft and aircraft in the Navy of the future is so closely linked together that the dividing line between naval personnel, and naval aviation personnel will be almost obliterated. Today there are placed on battleships of the first line, aviation details who are immediately absorbed into the organization of the ship, and the Fleet, that they will be required to serve. They are as much an integral part of the fighting units of the Fleet as are the men who serve the guns or those who stand at the helm in battle. In extension of this we may conceive of the duty that these units will be called upon to perform. When the naval engagement of the future threatens, the commander-in-chief will send his planes into the air to obtain information of the enemy. He would know their strength, their formation, and their probable plans.

The gathering of this information and its transmission to the supreme command will require on the part of the naval aviator an intimate knowledge of naval strategy and tactics. He must, in other words, be an extension of the faculties of admiral on the flagship, trained to the same habits of thought, and indoctrinated with the same principles of naval warfare. The naval aviator will be called upon to direct the fire, and with this he becomes at once an integral part of the fire control organization that is functioning below in order to co-operate to the fullest extent in the machine like precision of modern naval gunnery By the same token the naval commander of the surface ship must have a full understanding of the capabilities and limitations of his aircraft in order that he may intelligently direct their operations.

Knowledge of Naval Subjects

To the end that this close liaison may exist between Naval Aviator and the surface ships, the Navy Department has prescribed that officers detailed to aviation duty must give evidence of a thorough knowledge of naval subjects such as ordnance, navigation, and marine engineering, and they are further required to perform duty on shipboard which will give them a practical workable knowledge of the details of naval organization and its functions Likewise, those who are assigned to duty in connection with the operation of naval ships must give evidence of a practical knowledge of aviation in addition to a specialized knowledge of the duties they are called upon to perform as naval officers.

The Bureau of Aeronautics having full appreciation of the fact that naval aviation must exist as a part of the Navy, is actuated in its every project by a policy designed to fit aeronautics to naval needs and uses And this is best done by men drawn from the naval establishment who are intimately acquainted with its workings

The bureau carries out the work planned by it through the medium of organized establishments which have definite fields of accomplishment prescribed for them These establishments include the Naval Aircraft Factory at Philadelphia, the Naval Air Station at Lakehurst, N J, the Naval Air Station at Anacostia, the Naval Air Station at Pensacola, and an organized system for inspection and testing which reaches out and embraces the work being done by private industrial aircraft companies.

The Naval Aircraft Factory

The Naval Aircraft Factory at Philadelphia was brought into existence during the world war under wise provision by Congress to supplement and increase the output of aircraft which were necessary in the prosecution of the war This wise step envisioned the future of naval aviation beyond the immediate needs of the emergency and today the aircraft factory supplies a vital link in the chain of development. In addition to co-operating with industrial manufacturers in the production of types of planes to suit the requirements of naval service, the bureau is enabled to plan and to execute through the aircraft factory, work which could not otherwise be accomplished In the development of naval aviation, there has been, and is at the present time, urgent necessity for experimental work to the end that types of planes may be perfected which are best suited to the work they will be required to perform These experimental developments are prohibitive to the commercial manufacturer on account of the lack of immediate financial return, they are vital to the development of Naval Aviation along progressive lines, and are accomplished by the Naval Aircraft Factory under the direction of the Bureau Here are undertaken many features of construction supplemental to those being done for the Navy in the industrial field The factory also acts as a balance wheel and pacemaker for the aircraft industry In time of war, the Navy would possess facilities for quantity production of aircraft through this organization which could not be duplicated, and in times of peace, it is the means of keeping naval aviation conditioned and up to the mark from a material standpoint The reconditioning of navy planes is one of the most important functions of the factory It serves the same purpose in this respect as does the maintenance of navy yards for vessels of the Fleet The project of building the new rigid airship to be known as Fleet Airship No 1 is here being undertaken and pressed to successful completion, the parts for the ship being constructed at the factory in Philadelphia and shipped to the Naval Air Station at Lakehurst, N J for assembly.

Lighter-than-air activities in naval aviation will be centered largely in the station at Lakehurst where the new rigid airship is being assembled The Lakehurst station is equipped with a huge hangar capable of housing two or more of the largest airships that have ever been designed or built. The hangar encloses the largest space under one roof in the world In it the work of building the ZR1 is now progressing, and later it will be used for the housing of the ZR1 and ZR3, the latter now under construction in Germany to be delivered to this country on reparations account The shed which has been built to accommodate these leviathans of the air is complete in every detail as a repair base for airships containing as it does facilities for every character of work on them A mooring mast for handling these craft has also been completed, and the station is further equipped with gas tanks and other features necessary to airship service

Air Station at Anacostia

The Air Station at Anacostia operates directly under the Bureau of Aeronautics as a testing and experimental station. A corps of test pilots are retained at the station for this purpose, and new types of aircraft are brought here to be tried out Before being placed in service, every type of plane is subjected to rigid investigation to determine its suitability for the purpose for which it is designed, and a board of experts pass upon it In addition to the testing of planes, important research and development work is carried on at Anacostia in connection with communications and radio development.

Pensacola completes the link in the chain of service Here is carried on the training of the personnel that vitalize naval aviation Officers who are recommended for aviation duty are ordered to the Naval Air Station at Pensacola for a comprehensive training in aeronautics, and practical aviation They are first subjected to a rigid physical examination to determine their suitability for the duty, and are then given a course in the fundamentals of aeronautics This is followed by training in flight and the practical knowledge that must be the equipment of the naval aviator. Navigation, aerial gunnery, the theory of flight, strategy and tactics, structure and rigging, aerology and photography, all have their place in the course that is prescribed and carried out, and the result is, an individual equipped in every respect to take his place in the naval air forces. Naval Aviation training at Pensacola may be considered in the light of a post-graduate course in a branch of naval lore The fundamental and essential requirements are to be found in the existing rule that all officers who receive training in flying must first have had at least three years sea duty as naval officers in line duties Here they receive the important experience in the habits of the sea which enable them to function intelligently in naval aviation

An organized bureau where plans are formed, and from which activities are supervised and directed, supplemented by the means for carrying out these plans by the construction and testing of equipment and the training of personnel backs up the actual operations of naval aviation with the fleet

Classification of Naval Air Forces

The naval air forces now in existence may be classed under two heads i e those which are engaged in operating from bases and the units which are actively operating with the fleet and are an integral part of it Broadly speaking, the former class exists in the two main stations on the Atlantic and Pacific coasts, at Hampton Roads and San Diego respectively, and the outlying stations at Panama, and in the Hawaiian Islands

The Hampton Roads and San Diego stations in addition to the regular station activities also act as bases for the Fleet Squadrons and engage in the upkeep, overhaul, and repair of aircraft of these units

The Fleet Squadrons attached to the Atlantic and Pacific Fleets are handicapped in their sphere of usefulness at the present time, due to the lack of proper surface craft to tend them. This, however, is only contingent upon the completion of the airplane carriers that have been authorized and are now under construction. Meanwhile, these Fleet units are performing valuable service in exercises with the battleships as scouting and spotting planes, and in torpedo exercises.

And now for future plans. As far as can be foreseen, these must include adequate provision for the defense of the Fleet against air attack by hostile forces, they must also provide for attack, from the air, by our own forces on any enemy craft, surface, sub-surface, or aerial To this end, every naval vessel in time should carry aircraft as a protection against the aggression of enemy planes, and in addition, aircraft carriers must be provided which can carry every class of naval planes existing or to be developed. These carriers will take station in the Fleet, and execute the orders of the supreme command as an integral part of the Fleet organization. At the given order they will supply the planes for patrol scouting, combat, bombing or torpedo attack, and will with the combat planes launched from the fighting ships, ensure to the commander-in-chief the command of the air that will enable him the more expeditiously to take and keep command of the sea.

Air Legislation One Hundred Years Ago

Congress Petitioned to Give Monoply of Air to Inventor

The question of federal regulation of aircraft has brought to the notice of AVIATION a curious document that has an historical appeal to those interested in air legislation.

Mr Edward C Coffin of Worcester, Mass, has in his collection of historical papers a copy of the *Eastern Argus* published at Portland, Me, April 2, 1822. In it there appears an account of a petition to Congress by J Bennet of Philadelphia in which he asks for the exclusive right to fly

Bennet claimed the invention of a practical flying machine but had little opinion of its patentability

With the heading "Man-Flying," the item follows:

Truly this may be called the age of wonders—the era of inventions—noon-day of light and knowledge, on the earth, as appears by the following petition of a Mr Bent, of Philadelphia, presented to Congress on the 25th ult. praying that he and his heirs, for the term of forty years, may have the sole "right of steering flying machines through that portion of the earth's atmosphere, which presses on the United States" Thus it seems, while we are still rapt in wonder at the astonishing genius of a Captain Symmes, who has discovered that the earth is a hollow globe, and has lately petitioned Congress for aid to enable him to explore its interior, our astonishment is increased by the appearance of a more towering and etherial spirit, who asks the liberty to quit this dull ball, on which we live, in order to soar among the stars.

In the House of Representatives on Monday the twenty-fifth ult among the petitions that day presented, was the following by Mr Milnor

"James Bennet, a mathematician of the city of Philadelphia, most respectfully sheweth

"That your petitioner having invented a machine by which a man can fly through the air—can soar to any height—steer in any direction—can start from any place, and alight without risk of injury—and whereas a like machine has never been invented in any country or age of the world, so as to be applied to purposes of practical utility, and as it is more than probable that artificial flying would not for a thousand years to come, be brought to the same degree of prefection, had not your petitioner, under Providence, accomplished it, and, as it must be evident to all that Letters Patent would be of little use to the inventor in consequence of various modifications or improvements which might be made, and which never would have been thought of, had not the way first been opened by your petitioner He therefore solicits a special act of the Congress of the United States, to secure to him and his heirs for the term of forty years, or for such any other term as in their wisdom may be deemed just, the right of steering flying machines through that portion of the earth's atmosphere which presses on the United States, or so far as their jurisdiction may extend

"By granting your petitioner's request the honor of the invention shall be conferred on the United States

J BENNET, A. and M"

Philadelphia, Feb 13, 1822

Mr Milnor moved to refer the petition to the Committee on the Judiciary

Mr Sergeant opposed the motion He said that the committee did not undertake to soar into regions so high Their duties were nearer the earth. He moved to lay it on the table. Negatived

Mr Walworth moved to refer it to the committee on Roads and Canals Negatived.

The question then recurred upon referring it to the committee on the Judiciary, which was resisted by Mr Sergeant—on the ground not only that it was above their reach, but also that they had so much business before them of a terrestrial character, that they could not devote their time to philosophical and aerial investigations. The motion was lost, when Mr. Little renewed the motion to lay it on the table Carried

Aircraft Carriers Begun

Work has actually been started on the two big aircraft carriers for the Navy, it was recently announced by Acting Secretary Roosevelt Although the detailed plans have not been completed, the money was appropriated for the rebuilding of the two discarded battle cruisers in the "Scrapping Bill" and work on underwater parts of the hulls has been begun under an allotment of available funds.

The two hulls which were to have become battle cruisers, until the Limitation of Armament Conference ruled otherwise, are the Saratoga at Camden, N. J., and the Lexington, at Fore River, Mass

Kansas City Airport 153 Acres

In the August 7 issue of AVIATION the Kansas City Airport field was shown as comprising 53 acres. This should have been 153 acres.

Trade Note

The Cox-Klemin Aircraft Corp. has recently taken over the premises of the American Airways, and now occupy the entire factory at College Point.

Their effective floor space is now approximately 20,000 sq ft

The machine shop facilities have been enlarged

A large assembly floor is now available, used for assembling only A run-way from the assembly shop leads direct into the water

The bay at College Point is the center of flying activities. Four or five ships fly around the bay daily

The Cox-Klemin Aircraft Corp welcomes visitors to whom mooring and storage facilities can be extended at any time.

Repairing and overhauling can also be carried out on seaplanes of every type

The corporation reports that it has sold eighteen Navy MF flying boats

Navy Opposes Single Air Force

Admiral Moffett Gives His Reasons for This Attitude

"The airplane in the American Navy is being developed as an adjunct to the fleet and not as a substitute for the capital ship. Nobody in the service who is familiar with the development of aviation believes the advances made, phenomenal as they are, have rendered obsolete the surface fighting craft. There is nothing in the press reports of the recent bombing experiments with the British battleship Agamemnon that indicates anything more than we learned from the similar tests we carried on a year ago with the radio-controlled Iowa and the ex-German warships as targets."

This statement was made by Rear Admiral William Moffett, chief of the Bureau of Aeronautics, in commenting on press dispatches from London on the keen discussion over England's air problems that have come to a head following the recent bombing tests and Lloyd George's announcement of the government's ambitious air program.

Unalterable opposition to a Separate Air Service in the country under a single head, similar to the British Air Ministry about which incidentally a storm of controversy is raging was also voiced by Admiral Moffett.

Loss of Navy Possible Result

"I am unqualifiedly and unalterably opposed to a separate air service in this country," he declared. "I firmly believe that in time of war it would result in the loss of the surface Navy if naval aviation were developed and managed by men who know nothing of naval matters, naval tactics, navigation nor of the sea in general.

"Aviation in the Navy is being developed as an integral part of the fleet. With planes aboard the surface ships and carried on carriers with the fleet at all times, the men who manage these planes must of necessity be pilots with sea training not landlubbers. In my opinion it would be no more foolish to man our battleships with soldiers than to man the planes aboard them with landsmen.

"We of the aviation branch are bending all of our energies toward making naval aviation as much a part of the fleet as the submarines have become and to do this it must be manned and managed by men with sea training.

"In expressing my opposition to a separate air service I am expressing the views of practically all of the flying men of the Navy and am in hearty accord with the secretary, General Pershing, Admiral Sims, the General Board and others high in authority in both branches of the service."

The British Bombing Tests

Interest in the British bombing tests and the air controversy in England is not confined to aviation for press reports are being closely watched by naval officers in general with considerable discussion resulting all through the department. The consensus of opinion, based of course on press reports, among naval officers is that the Agamemnon tests brought out little that was not learned from our own extensive tests a year ago.

Then as now it was freely admitted that the development of aviation had made it necessary to plan certain changes in the big ships to meet the menace from the air just as was done when the submarine first demonstrated its effectiveness. Construction experts of our Navy do not believe that there will be any basic structural change in our capital ships. Thickening of the deck armor, strengthening of the side plates and lowering and increasing the below water armament are mentioned as some of the protective steps but most naval officers hold to the view that the new menace must be met with active not negative defense. Development of anti-craft weapons is being worked out but the main reliance against airplane attack probably will be our own planes.

In commenting on the London story today one of the ranking officers of our Navy not in aviation said:

Comment by Another Officer

"The Armament Conference placed a limit on capital ship construction, not only numbers but in the size of ships and guns. With such limitations it necessarily follows that there is a limitation in speed and armor. No restrictions however were placed on the building of light cruisers, destroyers, submarines and aircraft and therefore the paramount interest in the Navy centers today in the development of these weapons which are not limited by the treaty.

"Some people outside the Naval service seem to think that the Navy has little interest in aviation and is not pushing its development. This is not true for almost without exception officers throughout the service are keenly alive to the great possibilities of aircraft. The Bureau of aeronautics is developing torpedo planes which will be more effective in some respects than destroyers because of their greater speed and mobility.

"While still somewhat in the experimental or rather development stage these torpedo planes will be given a chance to demonstrate how far toward perfection their development has gone when the fleet and aircraft maneuvers take place within the next few weeks off the Virginia Capes. These tests will be watched with even keener interest as a result of the agitation that has been stirred up in British naval circles.

Battleship Not Obsolete

"The Agamemnon attacks furnished substantially the same lessons apparently as those we learned last year. They both demonstrated beyond question the actual potentiality of necraft but all sound-thinking officers disagree with the off-repeated claim that these tests showed the battleship is obsolete.

"Admiral Sir Percy Scott of the British Navy is quoted as saying most emphatically that the tests showed the battleship was obsolete. In his time Admiral Scott has done a great deal in developing gunnery and along other lines for the British Navy but some ten or twelve years ago, in his enthusiasm over the torpedo and submarine, he was equally as positive that the battleship was doomed. It would appear that he has again been carried away by his enthusiasm.

"The battleship is not obsolete—not yet at least. New methods of protection, new armor decks, new means of aerial defense may or may not keep pace with aerial development. On the other hand aviation may or may not find means of overcoming such handicaps as fogs, storms, etc. that now limit its effectiveness. These are moot questions. From the time of the battle of Salamis down to today the battle designing new defensive means to meet new offensive weapons has waged uninterrupted."

Fokker N-3 training plane (110 hp Le Rhône engine) which except for the powerplant has parts interchangeable with the C1 two-seater

The British Navy and Aviation

Ship Bombing Tests Lead to Provision for Defense Force of 500 Airplanes

The position the aviation service is to occupy in any scheme of national defense is becoming an acute issue in every country where air power is certain to play an important role. In Great Britain it has been solved by the Royal Air Force. But the naval and military services have awakened to the realization that aircraft are essential to their efficiency. This has resulted in an effort being made to secure a part of the aviation for both the navy and the army. As these matters usually come up in Parliament the facts are made public and can be discussed with more information than is usually possible.

The New York *Herald* on Aug. 9, printed a cable dispatch which is of interest to all who are concerned with governmental aviation. In part it is as follows:

Two days after a remarkable demonstration of the airplane's efficiency against the battleship Agamemnon, Prime Minister Lloyd George announced in the House of Commons the Government's decision to adopt the Air Minister's scheme to provide an aerial force of 500 machines for home defense, at an increased cost of £2,000,000 yearly.

Accepted as a victory in air circles, this means that Great Britain intends to keep apace in the race for aerial preparedness. As France leads the Continental nations in aerial development, the situation has been paralleled with the competition with Germany ten years ago. In the meantime Commons committees are still wrangling over whether the army or the navy shall own the air services or the Air Ministry control all. This important question was supposed to be settled long ago, but the firm stands taken by the three factions made anything like a compromise impossible, and the controversey has become a delicate problem for the administration.

The Navy is most persistent that it must control its own air wing. The Army admits the airmen's claim to individual service, but insists upon control of army air work. And the Air Ministry is valiantly struggling to stand alone, declaring that the nation's defense rests entirely upon a single organization.

Confirm Results of U. S. Tests

The Air Service demonstration against the pre-war dreadnought Agamemnon confirmed the results of similar tests in America, but the importance of air force efficiency, in the minds of the authorities, depends entirely upon how they feel on the larger question of who shall control the air. The navy adherents say the tests show that the navy must have an air fleet operating with it, while the Air Ministry thinks it has proved that the navy is helpless against aerial attacks. The planes that dropped 400 bombs upon and around the Agamemnon furnished, says the Manchester *Guardian*, a "convincing demonstration of the efficient modern bomber and the high degree of accuracy which recent sight devices have produced."

The bombs all were duds and many were dropped upon the deck, some from an altitude of *8,000 ft.* Other planes flying fast and low not only scored a formidable percentage of hits, but sprayed the decks with machine gun fire. The Agamemnon, wireless controlled, traveled at *fifteen knots* and was maneuvered readily. The demonstration occupied the whole day, during which the visibility was perfect, but the airplanes were working against a thirty-five mile wind.

In the first attempt four De Havilands, so high they could scarcely be seen, scored two direct hits and others so close that had they been depth bombs the ship certainly would have been doomed. Another squadron of four aircraft scored six direct hits on the deck. Then a formation of Camels dodged about at a low altitude and sprayed the decks with such effective fire that it probably would have driven the ordinary crew below. Then four Sopwith Snipes at an altitude of 200 ft. and traveling at the rate of 130 m.p.h. peppered the decks with light bombs. Only three bombs missed their mark.

The navy adherents say the tests proved only that the air service made navel warfare more expensive, because it adds complications to the defense of the battleship, rather than meaning the abolition of capital ships. They are agreed that the airplane can do no more than the submarine already has done to make battleships obsolete. They contend that the development of the airplane is only a repetition of the development of the submarine, and means merely that capital ships have got to meet another menace, and that steps will be taken to meet it.

But these theories are ridiculed, not only by airmen, but by some sailors, who think that the Agamemnon proved a helpless prey. Admiral Sir Percy Scott wonders what would have happened had depth bombs been used. He said it was another illustration that the capital ship, was of "no damned use at all". He adds:

"An opinion can always be damned, but a question is often damned difficult to answer. The question is, What is Lord Lee going to do with his battleships if we go to war with a European Power? Have we any safe funk holes to hide them in?" He says that this suggests the question whether they should build capital ships at all.

Night Air Mail Experiments

Experiments are going forwaed rapidly at Bolling Field with an Air Mail Service plane, to determine the best methods of radio communication between ground stations and planes. Night flying among other things demands constant communication both to and from planes in flight. To do this, of course, demands that a plane must carry an antennae, a receiving set, a sending set, and it must manufacture electricity. The 300 ft. copper trolling line which is let out behind a ship in flight is the antennae. Commercial companies, glad to cooparate in the big project, are working on radio receiving sets which will combine the qualities of light weight, a radius of 200 miles, and a single wave length.

The mail plane at Bolling field is now experimenting with equipment loaned by the Navy Department which is effective, but too heavy for practical use in air mail planes. Electricity will be produced by a generator run by a free fan which spins with the force of the air as the plane flies along.

The pilot requires a sound proof covering over his receiving set and a transmitter. Changes must be made in the ground stations too, if night flying is adopted. The fifteen stations between New York and San Francisco with the exception of Washington have radio telegraph equipment and for communication with the planes they will need radio telephone facilities.

The experiments being conducted at Bolling field have proven eminently successful. The problem now is to work out certain details.

Perfect Air Mail Record

Trans-continental air mail service completed on August 16, five weeks perfect record of operation. All three divisions reported their service had been flawless for this period. This is the best efficiency record the air mail service has made for all divisions since it has been in operation.

The operation of the air mail service is regarded as perfect when all the planes leave daily as scheduled and the mail is carried all the way to its destination by airplane.

The U. S. Navy Airship ZR1

Detailed Description of America's First Rigid Airship Now Under Construction

Erection of one of the very largest airships ever built, the ZR1, is going on apace in the big shed at Lakehurst, N J, under the eyes of the Navy engineers.

This is America's first rigid airship, and it is entirely of American construction. Another ship, the ZR3, is being built in the Zeppelin factory by Germany for delivery to the United States under the terms of peace This latter will be purely of a commercial type. To what use it will be put has not yet been decided, but it is possible that it may be used on an experimental passenger line, for it will represent the last word in foreign airship construction.

ZR1 as she will appear entering hangar

Following are the constructional details of the ZR1

General Form

The streamlined hull, with 25 faces, rounded in the bow and tapered at the rear, contains twenty separate gas cells for hydrogen—or, perhaps, helium—though the system of ventilation provides for the exhaustion of all hydrogen that may escape through valves or otherwise.

Along the lower part of the hull there is on the inside keel, triangular in cross-section, forming communicating corridor between the different parts of the ship

To the hull are suspended six cars one forward, a control and power car, in two parts, two pairs of lateral ("wing") cars, and one car aft The after end of the hull carries four fins two horizontal and two vertical), the elevation and direction rudders forming elongations of the fins.

In the larger part of the hull, the cross-section has the form of a 25-sided polygon, though the bottom panels are slightly wider than the other 24, which are all equal The number of faces of the polygon is reduced at the after end.

Principal Characteristics

Length overall, 680 ft., height 93 ft ; diameter 78 7 ft., horsepower 1800, speed, 60 m.p.h gas volume 2,115,174 cu ft.

Frame

The rigid frame of the hull, covered with cotton cloth laced over the main longitudinals, is made up of braced girders of duralumin, made in America and developed for airship work at the instance of the Navy These girders follow the meridians of the ship and form the edges of the faces or panels.

The girders rest on transverse frames, also consisting of duralumin girders forming polygons. Certain main transverses are braced in their planes by a system of steel brace wires connecting the vertices The gas bags are placed between these frames.

Main Transverses

The body has twenty-one main transverses, dividing the hull into twenty compartments. Each compartment, except that of the after end, contains a gas bag The illustration shows one of the main transverses as put together at the Philadelphia Naval Aircraft Factory It consists of a system of peripheral girders connecting the longitudinal girders in pairs and thus forming a 13-sided polygon. The thirteen corresponding girders are the main longitudinals. In the middle of each side of this polygon is a king post directed toward the interior, braced laterally by two oblique girders. On the outside, the king post projects slightly and supports the intermediate longitudinal girders located between the main longitudinal girders.

Supplementary girders inclose the corridor and form, with one of the longitudinal girders, the general skeleton of the keel. Certain of the transverses have no king post They are similar to the intermediate transverses but they have a system of interior brace wires.

Intermediate Transverses

Halfway between two consecutive main transverses is an intermediate transverse. Each transverse has a simple system of peripheral girders forming a 25-sided polygon. Each vertex supports alternately a main longitudinal and an intermediate longitudinal girder Two girders inclose the corridor These transverses are not stiffened by interior brace wires. Between certain transverses at the bow and stern are supplementary intermediate transverses.

Construction of Girders

The girders constituting the longitudinals and the transverses, as also most of the various girders of the skeleton, are of triangular cross-section The king posts are quadrangular The main longitudinals are the stronger and are about 360 mm high, the lighter intermediate longitudinals being about 210 mm thick.

These girders consist of longitudinal members of rolled

Official Photo, U S. Navy

A ring of the rigid airship ZR1 in course of assembly on a radial jig

sheet duralumin, braced by lattices made of stamped sheet duralumin. The thickness of the members varies from 0 8 to 2 mm ; that of the stampings varies from 0 4 to 0 8 mm. The lattices are riveted to the members and also riveted together in pairs at their intersections.

The girders are assembled by gussets of folded sheet metal and by brackets riveted to the girder beams.

Brace Wires

The vertices of the main transverses are joined by stays of piano wire, without adjusting devices; simply given an initial tension. The diameter is 2.5 or 3 mm A certain number of them end at the upper edge of the keel and at the two longitudinal girders of the keel. Double stays in the main transverses cross each other near the center and are fastened at the point of intersection by a special fitting to which is attached a longitudinal cable traversing the gas bags. This latter forms a point of support in case of a difference of pressure in two adjacent cells and especially in the case of a rupture of one bag Under these conditions the stresses are lessened in the transverses.

Longitudinal Girders

In the faces of the polygon the vertices of the transverses and the girders are joined by diagonal braces of piano wire, which are set up with an initial tension.

One system of main diagonals extends over the whole surface of the airship, excepting at the ends. The wires are 2 5 mm in diameter in the faces of the upper and lower parts of the balloon, and 3 mm in the faces near the equator The main diagonals join the joints of the main longitudinals and the main transverses and cross over the joint of the intermediate transverses and intermediate longitudinals.

A further system of secondary diagonals is fitted in the panels between certain of the girders. Below these girders there are no secondary diagonals, excepting in certain heavily stressed regions, in the vicinity of the cars, for example.

The secondary diagonals of 2 mm. wire join two by two the joints of the two neighboring main longitudinals and of the two neighboring transverses, one main and the other intermediate. At their intersection they pass through a fitting, riveted to the intermediate longitudinal between the main longitudinals.

Brace wires are attached to the girders by eyelets Loops are formed and secured by winding with steel wire and

Gas Bags

The gas bags occupy the space enclosed between the longitudinals and the main transverses. The total volume of the gas cells is 2,115,174 cu ft. The fabric used is a cotton cloth covered with gold-beater's skin They are attached to the framework along the ridge girder section of the main transverses and longitudinals.

A net of ramie cordage fastened along the longitudinal girders, hold the bags. The net is in turn supported by a wire net The latter consists of a double system of piano wires 1 8 mm in diameter, connecting the girders. The ends of these wires pass through eyelets in the fittings on the girders

Valves

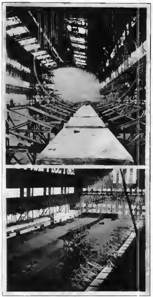
Each gas bag or cell is provided with an automatic valve, regulated to open when a certain pressure is reached These are arranged in pairs, opposite each other, at the base of an outlet chimney or shaft starting from the top of the keel and ending at the top of the ship under an outlet hood opening aft The exceptions to this are that in the bow the cells discharge through shafts having openings on the side of the ship to prevent the passage of air mixed with hydrogen near the machine gun platform

Sixteen of the cells have hand-controlled valves which are attached to a frame secured to the top girder of the ship. These valves also open into hoods, directed aft.

Keel

The framework of the keel is made up of girders and triangular frames spaced about every 7 5 ft. Some are situated in the plane of the main or intermediate transverses, the others halfway between these points. The lateral faces of the keel are braced by piano wires throughout their length The lower face is wire-braced only in part

The bottom face of the hull also forms the base of a prismatic keel of triangular cross-section fitted on the inside of the hull, extending practically its full length. This serves as a communication corridor between the cars and the different parts of the ship. The keel also carries the supplies, ballast, gasoline, bombs, spare parts, hammocks for the crew, etc.



Two assembly views of the ZR1

From the corridor one may descend into the control and power cars by the aid of streamlined ladders.

Ballast

The ballast consists of water, carried in bags of a capacity of 550 and 224 lb These are suspended from two longitudinal girders which run along each side of the keel Two of the main transverses also carry each fone bags called emergency ballast bags holding 550 lb each. These are especially designed for use when landing.

Gasoline Tanks

The gasoline tanks are of about 100 gal capacity and are suspended from the same girders as the ballast bags

Each engine has two of the tanks as feed tanks The other tanks contain the reserve gasoline which is transferred to the

tanks as needed by pumps through distributing pipes running along the passageway. Certain of the tanks are arranged to be dropped in cases of emergency.

Cars

There are seven cars: the foremost one contains the control station and immediately aft of it and so housed as to make it appear one with the control car, is the forward power car with a newly designed special Packard airship engine of 300 hp. driving a propeller through reduction gearing. The separation of the two cars is to eliminate vibration in the control car. This car also carries an auxiliary gasoline engine driven generator for radio.

The control car is divided into two divisions. For the forward end there are the steering wheels for direction and elevation, the compasses, barometers, inclinometer, engine telegraphs, speaking tubes and telephones. In the after end is the radio cabin, with padded walls, where the radio instruments are installed (except the generators). The antennae are hung from this cabin.

Cars 3 and 4 are hung close under the bottom of the ship, one either side. Each contains a 300 hp Packard airship engine driving a propeller direct.

Cars 5 and 6, still further aft are hung from the hull also, but slightly higher than the bottom of the keel and further outboard. Each of these contains a 300 hp Packard engine. These have reduction and reversing gears.

Car 7, still further aft, on the center line of the ship, also carries a 300 hp Packard airship engine driving a geared propeller.

The propellers are of wood, with metal-protected leading edges. The geared "props" are 16 ft. in diameter, the others 12 ft. The engines are intended to run at about 1400 r.p.m., while the geared propellers will turn at about 550 r.p.m. These reduction gears were especially designed for this airship and are the first airship gears built in this country.

Fins and Rudders

There are two vertical fins of triangular section and having different areas. The lower one is somewhat smaller than the upper. The rudders are of the plain "flap" variety.

The horizontal surfaces, are slightly smaller than the top surface. All the rudders are balanced. The elevators are also balanced by springs.

Both fins and rudders consist of a framework of braced girders similar to the girders of the hull, and covered with fabric.

There is a platform on top of the airship, near the bow. This platform, intended for observation purposes, has a floor of corrugated aluminum. It is reached by a vertical shaft from the corridor running up between the adjacent air bags.

Miscellaneous

In additional to the usual apparatus and accessories of navigation and maneuvering, respiratory apparatus for compressed and liquid oxygen, parachutes and life preservers are carried.

Crew

The regular crew is figured as follows: 1 commander, 1 second in command, 1 chief helmsman, 1 chief mechanic, 2 direction helmsmen, 2 altitude helmsmen, 10 mechanics, 1 radio operator, 1 assistant, 1 sail maker, 2 gasoline helpers.

Air Mail Tests High Compression

The Post Office Department has received word that the first of the high compression pistons lent by the Army and Navy Departments, have been installed in planes flying on the Cheyenne to Salt Lake City leg of the trans-continental air mail route. There, where the altitude is 6000 ft., and planes often have to fly more than 9000 to top the mountains, the rarified atmosphere lends itself to the use of high compression motors. The equipment loaned by the Navy will have 6 to 1 ratio while the Army pistons are designed for 6.5 to 1 compression.

Ordinarily airplane engines use a five to one ratio of compression. At sea level with an atmospheric pressure of 14.7 these engines will function at rated horsepower. However, in the higher altitudes where the air pressure is lighter the compression is necessarily less and the efficiency is cut considerably. Engines fitted with high compression for high altitudes knock at low altitudes. The Army and the Navy have long been experimenting to overcome the difficulty in order to increase the power of their machines in high flying. One of the developments has been an anti-knock fuel.

The Berliner Helicopter

In connection with the accompanying illustration of the latest Berliner helicopter, which machine is the first of its kind to have effected controlled horizontal flight (as distinct from drifting with the wind while hovering), the following particulars are of interest:

The machine is fundamentally built like an airplane, comprising a fuselage complete with engine, landing gear and tail surfaces. However, instead of the wings there is on either side of the fuselage a suitably braced outrigger, each carrying a propeller 14 ft. in diameter on a vertical shaft.

The latest Berliner helicopter

These two propeller shafts are driven in opposite directions from the engine by means of bevel gears shafts. The engine is a 110 hp Le Rhône, and the weight of the machine is 1300 lbs.

Near the tail there is a small propeller which is also geared to the motor and which tilts the entire helicopter by slightly lifting its tail. This tilt causes the forward motion of the machine, at the expense of lifting power.

The inventor claims, however, that with a 1,000 lb. load but 3 per cent of the lift is lost in a tilt of 15 deg. and that this loss is transferred into horizontal pull of about 25 per cent of lifting power. This is a somewhat greater tilt than has been used in most of the experiments, but he thinks that a 25 deg. tilt may possibly be reached safely.

On June 16 last, at College Park, Md., successful trials were made of the helicopter, after they were under close scrutiny of Army and Navy experts. According to these officers who witnessed the tests, there is absolutely no doubt that Mr. Berliner has actually perfected a helicopter which, after some few minor alterations will be able to rise straight from the ground to any distance required and then fly away just as does the ordinary airplane.

There were enough tests made of the machine at College Park to insure it becoming the greatest use both for military and possibly also for commercial, purposes. On three separate occasions the Berliner helicopter raised itself 12 ft straight up from the ground and then hovered at that height motionless, going neither forward nor backward, upward nor downward. In addition to these tests, Mr. Berliner took the machine on a flight around the track at College Park, demonstrating that the apparatus that gave the helicopter its upward lift did not prevent its forward motion.

Profitable Air Mail Service

That private air mail service would prove a profitable commercial venture if conducted with the same economy and efficiency as the Eastern Division of the Air Mail Service, is clearly shown in the following statement of Air Mail operations between New York and Chicago for the twenty-five flying days during July.

Using the official operating figures for the month in question and 2 mills per pound per mile as the service charge, as proposed in the Steenerson Bill, the revenue profit is shown as $6,436.49. On the other hand, basing the service charge on the so called "star route" rate of 2 cents per letter, a revenue profit would be derived of approximately $9,180.20.

It is understood that in cost of operations proper allowance has been made for capital investment for equipment and depreciation.

WEST

New York to Cleveland

25 mail trips completed with a total mail load carried of	8,805	lb.
Average mail load carried daily	352.2	lb.
Miles flown with mail	10,875	

Cleveland to Chicago

25 mail trips completed with a total mail load carried of	8,252	lb.
Average mail load carried daily	330.08	lb.
Miles flown with mail	8,375	

EAST

Chicago to Cleveland

25 mail trips completed with a total mail load

Cleveland to Detroit

carried of	11,131	lb.
Average mail load carried daily	445.24	lb.
Miles flown with mail	8,375	

Cleveland to New York

24 mail trips completed with a total mail load carried of	9,538	lb.
Average mail load carried daily	397.83	lb.
Miles flown with mail	10,440	

SPECIAL MAIL TRIPS

5 mail trips completed with a total mail load carried of	2,503	lb.
Average mail load	500.6	lb.
Miles flown with mail	800	

Total pounds of mail carried Eastern Division	40,239	lb.
Total miles flown with mail Eastern Division	38,865	
Average mail load carried from New York to Chicago daily	682.28	lb.
Average mail load carried from Chicago to New York daily	843.17	lb.
Average mail carried daily on entire Eastern Division	1525.45	lb.

If the revenue were figured according to the proposed Steenerson Bill (at 2 mills per pound per mile), revenue earned would be	$29,755.40
Cost of operation, July, at $.60 per mile (approx.)	23,319.60
Revenue Profit	$ 6,436.49

If the revenue were figured at $.02 per letter (40 letters per pound or 1,624,960 letters) which rate is paid star route carriers, etc., the revenue earned would be	$32,499.20
Cost of operation, July, at $.60 per mile (approx.)	23,319.00
Revenue Profit	$ 9,160.20

PERFORMANCE—EASTERN DIVISION, JULY, 1922.

(25 Flying Days)

1 trip—Bellefonte to Hazelhurst—uncompleted.

Percentage performance—99.5%

Eight forced landings—(4 mechanical
(4 account weather

International Air Congress, London, 1923

Following on the Congrès International de la Navigation Aérienne held in Paris in November 1921, it is proposed to hold a similar congress in London toward the end of June next year. Group Captain H.R.H. the Duke of York, K. G., G.C.V.O., R.A.F., has consented to become President of the General Council of the Congress and the Rt. Hon. the Lord Weir of Eastwood, P. C., has accepted an invitation to become a Vice-President. A strong organizing committee representative of all phases of British aeronautical activity, including the Air Ministry, has been formed, with the Duke of Sutherland as Chairman, Charles V. Allen as General Secretary and Lt. Col. W. Lockwood Marsh, O.B.E., as Technical Secretary.

The Congress will be open to all countries which are signatories of the International Air Convention, or are Represented on the Fédération Aéronautique Internationale, individual invitations being issued through national committees in process of formation in each country. Membership will be divided into two classes: (a) Ordinary Members, and (b) Associate Members, comprising the families of ordinary Members, at a subscription of £1 and 10/- respectively.

According to present arrangements the Congress will occupy one week during the last fortnight in June 1923, the reading of papers alternating with visits to various aircraft factories and establishments. It is hoped that the Air Ministry will be able to arrange for the Royal Air Force Pageant to take place on the Saturday of the Congress week and that the Royal Aero Club may organize a race meeting on the Tuesday or Thursday. Monday, Wednesday and Friday will be devoted to the reading of papers, and discussions thereon, which will be divided into four or more main groups or sections which will hold simultaneous sessions in different rooms.

As the time available for reading of papers will be limited, a "reading committee" is to be formed, though it is hoped to arrange that the official report of the Congress to be published later shall contain a wider selection of the papers sent in. An official reception will be held in the evening of the Monday of the Congress week and the proceedings will be closed by an official banquet on the Saturday.

It is important that the Congress should not be confused with the British Air Conference called each year by the Air Ministry. The latter is of a domestic nature dealing with aeronautical matters so far as the British Empire is concerned. The Congress, on the other hand, is essentially international in character and is intended to be one of a series to be held in various countries at which experts may meet to discuss the technical and scientific development of aeronautics in all its aspects.

To Catalina Island Via Air

The trip to Catalina Island, a point of interest tourists in California rarely neglect to visit, is now made possible by airplane.

The Pacific Airways inaugurated during the month of June an aerial service from Los Angeles to Catalina Island, using two converted HS-2L Flying Boats, each making three round trips per day. One of the boats, a closed model limousine, which was put in service during the middle of the month, instantly found popular favor with the flying public. Up to June 21st, 218 passengers were handled, the majority of them going from Catalina to the mainland. The distance of 27 miles to Catalina is negotiated in an average time of 25 minutes.

Canadian Air Board Abolished

An Act was recently passed by the Canadian House of Commons by which the duties of the Canadian Air Board and of the Naval and Military Departments are to be taken up by a Ministry of Defence. A Defence Council is to be set up which will consist of the Ministry of Defence (President), Deputy Minister (Vice Prest.) a member who will perform the duties vested in the Deputy Minister of the Naval Service, and four other officers.

Flying Meet at Tarkio, Mo.

Considerable success attended a flying meet held July 26-29 last at Tarkio, Mo Some twenty airplanes participating in the various events.

The meet opened at 2 p m. on July 26 with formation flying of a dozen ships lead by a Bellanca CF cabin monoplane piloted by the air mail pilot W C Hopson. The latter had flown the ship, with Victor H Roos, his wife and Tom Donahue as passengers, from Omaha to Tarkio in 45 min. Next came a speed race of three laps for ships rated at less than 100 m.p.h. speed, over a six mile course in constant view of spectators, which was won by Walter Beach in a Laird Swallow in 12 min. 56 sec. The Petrel in this race cut corners at the pylons and was disqualified.

Next came a triple parachute jump by Charles Hardin, then wing walking by Pat McCarthy Next on the program was a gliding contest open to all, and when the Petrel, two Swallows, two Jennies, two Standards and the Bellanca had all leveled off at 2000 ft altitude, the observer who was at the same height zoomed up as a signal for all to cut their motors and glide back to the field. The Bellanca was the last to land, staying in the air 5 min. 5 sec, winning the contest by one minute over the next competitor.

An exhibition of stunt flying by Slanigen of Lincoln, Nebr, in his Fokker, and by Hopson, and another parachute jump by Chic Bolt, were the following events.

The next morning Pilot Hopson having flown the Bellanca upside down for about two miles, performing nearly all the stunts in the catalog, landed and in avoiding another ship, taxied into a ditch and broke the propeller and landing gear struts and wheel which put the Bellanca out of Friday's events. These were started with the second heat of the speed race of ships with less than 100 m p h speed and which was again won by Walter Beach in his Laird "Swallow" Then came a parachute spot landing contest which was won by Chic Bolt of Red Oak, Iowa. After Rube Wagner of Red Oak had won the silver cup for spot landing with a dead stick, he and Pat McCarthy took a Jennie and proceeded to give the crowd some thrills in daring and wing walking when all at once they performed a thriller they didn't intend by crashing to earth from 100 ft. altitude The Jennie was a complete washout, but fortunately Pat McCarthy, whose head went through the wing, was able to go to the dance that evening and was none the worse. Wagner was severely shaken up and received a slight cut on the scalp, but otherwise emerged OK

The third day's program started with the Bellanca again in condition with a patched landing gear, a borrowed Jennie propeller and a new wheel It entered and won the climbing event, making the 2000 ft ascent in 2 min 24 sec, with the Fokker a few hundred feet below

Next came the handicap speed contest for ships with 100 or more miles per hour rating The pilots being unable to agree on handicap, C E Tuttle of Red Oak who was running the meet suggested the following Four laps to be run, the first to be used as the rated speed for handicap basis, and the last three to be the race, if a pilot should make more than 5 sec. better speed in any lap of the race to be disqualified but permitted to make 5 sec better The results were as follows The Fokker which made the first lap in 2 min. 48 sec made the last three in 2:43—2:41—2:40 respectively, and was thus disqualified by running faster than the permitted 5 sec, in each lap Hopson in the Bellanca made the first lap in 2:59 and the last three in 3:02—2:59—2:59 respectively thus winning the cup, while Walter Beach in a Swallow made his first lap in 3:19 and the last three in 3:21—3:25—3:19 respectively thus winning second

The above method may be of interest to other meet promoters in handling a handicap race where a definite speed rating is hard to obtain and in this way Jennies may run against DH's and stand a good chance of winning

The last event on the program was an efficiency contest figured as follows A pilot was debited one point for each foot used in taking off, one point for each foot used in stopping the plane after the wheels once touched, one point for each minute of fraction thereof used from the starting of the plane till it came to a dead stop after flying the course two times. Seven points for every pound of gas consumed and credited with one point with every pound of passenger carried. In this event Hopson with the Bellanca was disqualified after having won the event by a good margin, because instead of landing after the second lap he flew the course again and the judges failed to get the time. Walter Beach, on a Laird Swallow, took the cup, while Sloniger on a Lincoln Standard was a close second

The Boston Air Port

Boston business men are cooperating in raising the $13,870 needed for an aviation landing field in East Boston, according to W Irving Bullard, vice president of the Merchants National Bank of Boston, who, because of his known enthusiasm for the development of aeronautics in New England, has been selected treasurer of the Boston Chamber of Commerce's campaign committee. Mr Bullard emphasizes that the airport will expedite commercial banking and financial transactions, in addition to giving aviation a long-needed impulse.

In this respect he says in *The Boston Transcript*. "Just a little cooperation on the part of the business men of Boston will bring to our city a great aviation field with all of its commercial advantages A committee of the Chamber of Commerce is raising $13,870 to meet the difference between the State appropriation for the work to be done at the East Boston Landing Field and the contractor's bid Public-spirited citizens are contributing to this fund, but greater response must come from the business men of Boston if we are to have our aviation field.

"It is perfectly obvious to me that the establishing of a landing field in East Boston will bring to our merchants many advantages In the first place, air service between Boston and New York and the great cities of the West will greatly facilitate business and bring to the mailing department a part of the advantage that the commercial world has gained by the development of the telephone It is conceivable that the business men and the banker can make a substantial saving in interest charges by having drafts, negotiable instruments and payments made in New York the same day that the documents are sent from Boston, by airplane, instead of having a day's delay as is now necessary when mail is sent by railroads New York checks received by Boston merchants can be sent to New York by air service for credit at New York banks the same day This means a saving of one day's interest The New York Clearing House might easily extend its clearing one hour, that is, instead of final clearing at eleven o'clock, have it at twelve, which would mean that air mail leaving Boston at nine or even nine-thirty, could easily arrive in New York in time for receipt by New York Clearing House for that day's clearance There are other collateral advantages to the landing field, such as developing Boston as a center for the arrival and departure of tourists to the northern resorts of New England, because eventually air service should be established to the various important summer resorts of the East as outlined in the map shown in the *Transcript* in February. The railroads would naturally gain by having Boston develop its aviation, and various branches of industry should receive an impetus from the development of commercial aviation in this city

"The Chamber of Commerce intends to make a personal appeal to every public spirited member, and it is expected that the response will be quick and liberal Due acknowledgement of all contributions should be made by a receipt and also through the press."

Race for Light Airplanes

The Detroit Aviation Society has asked the cooperation of the Aeronautical Chamber of Commerce of America, Inc in securing entries for the National Airplane Races.

Entries in Event No 3, the Aviation Country Club of Detroit Trophy Race for light commercial airplanes, are particularly desired

For further information write: The Detroit Aviation Society, Inc., 4612 Woodward Ave., Detroit, Michigan

Record Packard Engine Performance

An airship engine built and tested under Navy Specifications has established a world's record for fuel economy and a performance record which experts in the Bureau of Aeronautics state has never been equaled by any other engine

This announcement was made as the result of a 300 hr test of the engine designed for use in the Fleet Airship ZR1 now under construction at the Naval Air Station, Lakehurst, N J. The engine was built by the Packard Company of Detroit on specifications furnished by the Bureau of Aeronautics of the Navy Department. These specifications were prepared with the view to securing two main features in the airship power plant; first, dependability and endurance and second, economy of fuel. The test recently completed has demonstrated that the engine built by the Packard company has fulfilled every expectation along these lines and will prove the best power equipment for airships that has ever been developed

Based on the performance under test officials of the bureau state that the engines to be installed in the ZR1 will be able to establish the lowest figure for fuel consumption yet recorded in airships operations. This means the insurance of a maximum cruising radius for the airship.

In laying down specifications for airship engines, it was stated, one of the prime considerations was low fuel consumption Airships of the type now building might be required to remain in the air for weeks at a time and in this case the fuel carried would exceed the weight of the engine itself For this reason it was more desirable to obtain fuel economy than lightness of construction in order to decrease the total weight to be carried It was also specified that the engine should incorporate features which would enable and facilitate the making of major repairs in the air and during the test recently completed the practicability of making such repairs was demonstrated to the satisfaction of naval inspectors.

The three hundred hour test was divided into two periods of one hundred and two hundred hours each and was made in runs of from eight to ten hours with continuous runs of thirty and forty hours recorded toward the latter part of the test. At the end of the 100 hr period the entire engine was broken down and examined for wear in the running parts and the general condition of the fuel, water and ignition systems All parts were found to be in exceptionally good condition. The engine was then reassembled and a 200 hr period was completed. At the end of this severe test it was reported by inspecting officers that the engine could have continued on a test duplicating the one just finished. The new Fleet airship will carry six of the engines and will have a rated horsepower of 1800 When cruising at 6000 ft. altitude the engines are required to develop an average of 250 b.hp each and turn up a speed of 1400 r p m The engine tested fulfilled and exceeded these requirements. With wide open throttle a horsepower of 370 was recorded and the average horsepower developed was 256 at an average speed of 1412 r p m

The fuel economy record established in the test is represented by the amount by weight of gas consumed per brake horsepower per hour This expenditure was recorded as 438 lb over the entire test period

Twelve engines will be provided for the ZR1 Six to be installed and six others to be kept as spares complete

Seven Thousand Mile Pleasure Flight

George W Haldeman, President of Inter-City Airline Corp of Lakeland, Fla, well known in exhibition work over the southern states for the past three years having filled exhibition contracts at most of the largest fairs in the South and H E Cornell, left Lakeland, Aug 7, for Dayton, Ohio Aug 8, where they have purchased an airplane of the Johnson Airplane and Supply Co. of Dayton. The machine has a 225 hp Benz Motor and carries a gas supply of ninety gallons capable of about six hours flying

Messrs Cornell and Haldeman do not intend to try to break any cross country flying records but are merely taking a seven thousand mile pleasure trip by air. Their new plane has been christened the "Skylark".

The start in their plane will be made at Dayton, Ohio, their course taking them through St Louis, Kansas City, Denver, Colo., Salt Lake City, Boise, Idaho and Walla Walla, Washington, which is their destination going out

The return will be made over a northern course through Montana, North Dakota, Minnesota, Wisconsin, Chicago, Ohio and Pennsylvania to New York City From New York they will return to Florida, via Washington, D C, New Port News, Va., Wilmington, N C, Savannah, Ga., and Jacksonville, Fla., bringing their trip to a close at Winter Haven, Fla, Mr Cornell's home.

Mr Cornell has for the past year been flying with Mr. Haldeman on business trips around Florida and during the past sixty days has completed a course of instruction.

Aircraft Speed Instruments

N.A.C A. Report No. 127

This report, by Franklin L. Hunt and H O Stearns, consists of three parts relating respectively to air-speed indicators, the testing of air-speed indicators and the principles of ground speed measurement.

Part I first discusses the different types of instruments which have been proposed for the measurement of air-speed and then gives detailed descriptions of most of the instruments, not only of America but also of British, French, Italian and German manufacture, which have reached the state of extensive use as service instruments. A statistical summary of the tests on air-speed instruments of the pressure type made at the Bureau of Standards during the recent war is given and also a short discussion of the altitude effect on air-speed indicators with a practical table of corrections.

Part II describes the methods of testing air speed indicators used at the Bureau of Standards, together with the tolerances which service instruments should meet Experimental data and sample reports showing the results of tests are also given.

Part III discusses the physical principles of ground speed measurement and the methods which have been devised for their practical application to the determination of the ground speed of aircraft.

Aerial Navigation and Navigating Instruments

N.A.C.A. Report No. 131

This report, by H N Eaton, outlines briefly the methods of aerial navigation which have been evolved during the past years and describes the instruments used.

Dead reckoning, the most universal method of navigation, is first discussed. Then follows an outline of the principles of navigation by astronomical observation, a discussion of the practical use of natural horizons, such as sea, land, cloud, and haze in making sextant observations; the use of artificial horizons, including the bubble, pendulum, and gyroscopic types; and a description of the rapid methods and the special instruments which have been devised to expedite the reduction of observations and the plotting of position Lastly, the comparatively recent development of the radio direction finder and its application to navigation are discussed.

Cleaning Radiators

It is frequently found that a radiator, which has previously given good service will apparently become defective and allow the engine to overheat. This may be due to the accumulation of sediment in the upper part of the radiator

The most satisfactory way of cleaning out this radiator is to detach the radiator from the machine, turn it upside down and run through a weak solution of caustic soda from the bottom to the top, and then blowing steam through, if this is available, finally thoroughly cleansing by washing out with cold water. On no occasion should caustic soda be used to clean out the system when the radiator is connected to the engine, as it is very difficult to ensure that the system is cleaned out and pitting of the cylinder jackets is liable to occur.

—*Canadian Technical Memorandum*

Competitors for the Deutsch Cup

According to our contemporary *Les Ailes*, the Deutsch de la Meurthe Cup race which is to take place Sept. 22, next, at the Villesauvage airdrome, near Etampes, France, will assume a truly international aspect, for five countries are expected to participate in it. These countries are France, Great Britain, Holland, Italy and the United States.

The regulations for this contest provide that it is to be international, each nation being represented by not more than three airplanes. Hence, in such countries where there are more than three prospective competitors for the cup, an elimination race has to be run.

Among the French machines which are mentioned as certain defenders of the cup are two Nieuport-Delage sesquiplanes which, it is said, will be equipped with 500 hp. Sunbeam-Coatalen engines, and which will have a wing loading of about 21 lb./sq. ft. (105 kg / sq m.). The Hanriot firm is said to be building a monoplane with 20 lb wing loading, and other possible cup defenders include a 300 hp Borel and a 300 hp Letord all-metal monoplane. Finally, it is alleged that a Deperdussin monoplane and a tailless airplane of very high speed will also enter the French elimination race.

Two challengers are expected from Great Britain, one is the Gloucestershire Mars 1 ("Bamel"), fitted with a 450 hp Napier "Lion," and the other a Bristol monoplane fitted with a 400 hp Bristol "Jupiter" engine. Herbert James, who piloted the Bamel in last year's race, in which he was defeated by the French entrants, will probably again pilot this machine, which has since been considerably "cleaned up" in an effort to make good the English claim as to its being the fastest airplane in the world. Speed trials conducted according to F A I rules have not so far borne out this claim, for the world's speed record for a one kilometer course is still held by Sadi Lecointe with 205 m p.h., made on a Nieuport-Delage sesquiplane.

From Holland the entry of a Fokker monoplane equipped with a 360 hp Rolls-Royce "Eagle" engine is expected, while Italy will be represented by a Fiat racer equipped with a 700 hp Fiat engine, to be piloted by Brak-Papa, and possibly by a Marchetti racer.

According to our contemporary, American participation this year is almost certain and our challengers are to include one of the Army racers under construction at the Sperry plant to the designs of Alfred Verville (which are also to participate in the Pulitzer race) and a Thomas-Morse MB7 monoplane.

Reply to Criticism of Soaring Article

Editor, AVIATION —

Mr Halsted criticizes my article on Soaring in the AVIATION, Vol XII, No 26, June 26, 1922.

The position taken by Mr Halsted demonstrates once more the fallacy of placing too much stress on one law of physics, at the same time ignoring other equally important law.

While "The principle that force is a vector and has a direction and sense, and that mass can receive no motion from a force in a plane perpendicular to its vectorial direction" is true in a case of single force, it is also true that two forces acting on a mass in opposite sense produce acceleration in trajectory, determined by the relative strength of the two opposing forces and the angle at which they act. In the case of soaring we have force of gravity pulling downward in a vertical sense and force of wind acting at right angle to the surface and producing upward lift. With ordinary surfaces where there exists more or less drag, these two forces will not be strictly diametrically opposed, but will meet at an obtuse angle while in helicoidal wing they will act at a reflex angle, as negatively inclined portion of the wing instead of retarding, produces forward component.

To apply the principle "That a mass can receive no motion from a force in a plane perpendicular to the vectorial direction" to soaring would mean to deny the fact of soaring, as above stated principle applies to wind force as well, and we can conceive no other forces that would contribute to the soaring.

Experiments brought out the fact that gravity plays an important role in soaring: changing of the position and amount of the weight affected the performance considerably.

Mr Halsted singles out the Fig No 2 of my article, and on the strength of this proceeds to eliminate all theory, while this diagram was intended merely as an analogy to illustrate condition shown in Fig No. 1 and to explain the part that wind plays in a soaring flight.

Illustration No 3 deals with effect of gravity on soaring and some way or another Mr. Halsted had nothing to say against the facts illustrated in this diagram. Fig No 3 shows how gravity, acting through the advanced center of weight, imparts forward motion to the plane. Of course, this is possible only with arrangement of surfaces shown in Fig No 5 in my article. With plane surfaces, advanced center of weight would be detrimental, or if coincident with the center of pressure, condition shown by Mr Halsted would result. But Mr Halsted's assertion cannot be applied to the arrangement of surfaces described in my article, for in a helicoidal wing of a pterygoidal shape we have many different angles of attack. Juxtaposition of the differently inclined surfaces in combination with advanced center of weight transforms the two opposing forces in to forward motion. Many experiments with small models have substantiated this, and I will be in a position to demonstrate more clearly as soon as my man carrying machine is completed. Performances of small models were limited for the reason that no controlling could be effected, but nevertheless they brought out important facts regarding the soaring flight.

J. W. RUBEN
Portland, Oregon.

Altitude Instruments

N.A.C.A. Report No. 126

This report, by A H Mears, H B Hendrickson and W G Brombacher, in four parts covers the general field of altitude instruments and closely related subjects.

Part I on altimeters and barographs, discusses briefly the subject of barometric altitude determination. A detailed description is given of the principal types of instruments used in England, France, Germany, Italy, Denmark and America.

Part II, on precision altimeter design, deals with the errors of altimeters in general and states the principles of design and some of the instances where more precise indications are required.

Part III, on statoscopes and rate of climb indicators, mentions the uses of these instruments and presents a detailed study of the various types and methods of testing used.

Part IV, on aerographic instruments, mentions the various mechanisms and devices used in thermograph construction and describes several typical instruments. Meteorographs of various types and strut thermometers, and their uses, are included.

Esprit de Corps in the Air Mail

"The Mails must be delivered," R B Levisee, pilot of the Air Mail Service, remembered this commandment of the postal service when he was forced down on the Great Salt desert recently on a trip between Salt Lake and Elko carrying mail.

Levisee made a good landing and began inspecting his plane. He discovered one piston was badly burned and that he would be unable to go on. Leaving the plane he picked up the trail of the railroad track he had been following and trudged twenty miles over the hot desert until he reached a railroad station. The telegrapher wired Levisee's message to Salt Lake City.

In a short time Paul P. Scott appeared on the scene in a plane from the Air Mail field at Salt Lake. The mail was transferred from Levisee's machine to Scott's and he delivered it safe and sound at the terminus. The mail was a little late, but it was delivered and the air service maintained its record.

ARMY AND NAVY AIR NEWS

Air Service

Examinations for Appointment of Second Lieutenants—The date for the examination for appointment of second lieutenants in the Regular Army has been postponed from Sept. 4, 1922 to Oct. 23, 1922.

In order to procure for the Army, through this examination as many young men as possible who are especially fitted by education and training for appointment as second lieutenants, the War Department has adopted the following policy.

(a) The educational institutions designated as "distinguished colleges," as a result of the 1922 inspection, will be allowed to designate, upon the specific recommendation of the professor of military science and tactics, for appointment as second lieutenants in the Regular Army, not more than 25 per cent of the total number of this year's graduates who completed the second year of the advanced course in a combat unit of the R. O. T. C., and who will be eligible on Jan. 1, 1923 for such appointment. This number is not in addition to the five per cent who have already been designated "honor graduates."

(b) All other colleges and universities which were inspected by the War Department's representatives in 1922, or recommended for such inspection and not designated "distinguished colleges" will be allowed to designate upon the specific recommendation of the professor of military science and tactics, for appointment as second lieutenants in the Regular Army, not more than fifteen per cent of the total number of this year's graduates who completed the second year of the advanced course in a combat unit of the R. O. T. C., and who will be eligible on Jan. 1, 1923, for such appointment.

(c) The individuals to be included in the twenty-five per cent and the fifteen per cent of the total number of graduates, etc., referred to in (a) and (b) above are limited to those who are judged by the professor of military science and tactics to fall within the block represented by the twenty-five per cent or the fifteen per cent, respectively, of the most promising officer material. It is, therefore, not contemplated that these percentages shall be applied only to those who may desire appointment. Only those, and no more, shall be recommended who by reason of outstanding qualifications fall within the top blocks as limited by the designated percentage of the whole.

The candidates referred to above will be granted exemption from the entire mental examination, as is allowed honor graduates of "distinguished colleges" under the provisions of existing regulations. This exemption, however, will apply only to the examination ordered for Oct. 23, 1922. The professors of military science and tactics have been instructed to recommend only those for exemption from the mental examination whose attainments in scholarship have been marked and whose proficiency in military training and intelligent attention to duty have merited his approbation.

This examination is still open to all classes of eligibles, that is, to a male citizen of the United States between the ages of 21 and 30 years, either a warrant officer or enlisted man of the Regular Army of more than two years service as such, or a reserve officer, an officer, warrant officer or enlisted men of the National Guard, a member of the Enlisted Reserve Corps; or a graduate of a technical institution approved by the Secretary of War (the institutions referred to in a, b and c above). Information relative to the scope and details of the examination may be obtained at any military post or station. Applications may be submitted at any military post or station or at the headquarters of the Department or Corps Area in which the candidate resides.

Vacancies in the grade of second lieutenant in the Regular Army exist in the following branches—Air Service, Cavalry, Chemical Warfare Service, Coast Artillery Corps, Corps of Engineers, Field Artillery, Finance Department, Infantry, Ordnance Department, Quartermasters Corps and Signal Corps.

Air Service Reduced in Army Reorganization

The enlisted strength of the Regular Army has been reduced to 125,000 as provided by the War Department Appropriation Act for the current fiscal year. This completes a reduction which has been virtually continuous for eighteen months, totalling approximately 100,000 men, or 45 per cent of the actual strength.

Plans for the reorganization of the Regular Army have been completed and are being effected at the present time. These call for the reorganization of the army into definite tactical units, the distribution of these units throughout the United States and its possessions to meet the various local requirements, and the quartering of the troops in available permanent quarters. The general redistribution in the United States is being delayed in order not to interfere with the training of the civilian components of the Army of the United States during the summer camps.

The following table is a comparison by branch and service of the authorized pre-war strength, the authorized strength of the army as it was reorganized after the war, and the strength authorized by the current appropriation bill.

	1916 National Defense Act	1920 National Defense Act as amended	1922 App'n Bill for F. Y. 1923	1922 in per cent of 1920
Infantry	88,010	110,000	46,423	42.2
Cavalry	25,525	20,000	9,871	49.4
Field Artillery	18,249	37,000	17,173	40.4
Coast Artillery Corps	30,126	30,000	12,026	40.1
Corps of Engineers	5,633	12,000	5,020	41.8
Air Service	3,320	16,000	8,500	53.1
Signal Corps	3,913	5,000	2,184	43.7
Total combatant	174,776	230,000	101,197	44.0
Q. M. C.	15,000	20,000	8,000	40.0
Ordnance Dept.	4,500	4,500	2,307	51.3
Finance Dept	—	900	399	43.7
Chemical Warfare Service	—	1,200	445	37.1
Medical Dept	10,610	14,000	6,850	48.9
D. E. M. L.	8,402	9,400	5,704	60.9
Unass'd Recruits	13,889	—	—	—
Not allotted	—	—	104	—
Total	226,682	280,000	125,000	44.0
U. S. M. A. Detcht	616	—	—	—
Total	227,198	280,000	120,000	44.6

Overseas Possessions

Twenty-eight thousand, two hundred and seventy-seven (28,277) American soldiers have been allotted to our overseas possessions.

As a result of this allotment there remains for use in the United States (including the forces in Germany) a total of 96,723 enlisted men for the performance of the many duties assigned under the National Defense Act The following table is a distribution by branch and service of the American soldiers in our overseas possessions and the United States.

	Overseas	United States
Infantry	12,085	34,338
Cavalry	—	9,871
Field Artillery	4,180	12,993
Coast Artillery	5,600	6,426
Air Service	1,884	6,616
Engineers	1,450	3,570
Signal Corps	474	1,710
Quartermaster Corps	1,289	6,711
Finance Department	83	310
Ordnance Department	326	1,981
Chemical Warfare Service	68	377
Medical Department	838	6,012
D E M L.	—	5,704
Unallotted	—	104
Total	28,277	96,723

Reductions in Air Service

To become inactive 14th Sq Bombardment, Airship Co. No 16 (Scott), 9th Sq (Obs) (Mather), 19th Sq (Pur) (March), 18th Sq (Obs.) (Rockwell), Balloon Cos No 1 and 13 (Ross), Balloon Cos No 20 and 22 (Eustis), Balloon Cos. No 4 and No 5 (Brooks), Balloon Cos. No 17 and No 27 (P I); Balloon Cos No. 3 and No 21 (Hawaii), 28th Sq Bombardment (Mather), 39th Sq (School) (Kelly)

To be demobilized Airship School (Langley); Balloon Observers Schl (Ross) Observation Schl. (Post), Communication Schl (Post), Photo Schl (Langley)

To be organized 45th Sq (Bomb) (P I), Hq 9th Group (Obs.) (Mitchell), Photo Sec No. 20 (Langley); Service Co (Airship) No. 24 (Scott), Photo Section No 21 (Scott), Hq 11th Group (School) (Brooks); 46th and 48th Sqs. (School) (Brooks).

To be reconstituted. Hq 2nd Wing (Langley).

Instructions have been given or are being prepared for withdrawing troops from the following Air Service Stations Carlstrom Field, Fla.; Dorr Field, Fla., Ellington Field, Tex., Rockwell Field, Calif , March Field, Calif , and Lee Hall, Va

Reduction in Officers

Of the total reduction of 2516 officers, 800 promotion list officers in the grade from colonel to first lieutenant may be retained until absorbed or recommissioned in the next lower grade, which leaves a minimum reduction of 1716 that must be effected this year by retirement, resignation or discharge. This is a minimum reduction of 13 5 per cent, or approximately of one officer out of every seven

* * *

Ecuadorian Officer Graduates—Lieut Freile Air Service, Army of Ecuador, successfully completed the course in Engine and Plane Maintenance at the Air Service Mechanics School, Chanute Field, Rantoul, Ill., and is now awaiting orders for his return to Ecuador

* * *

Flying Along the New Airway—The first official regular trip on the new airway connecting McCook Field, Dayton, Ohio, with Mitchell Field, Long Island, New York, and Langley Field, Va via Bolling Field, Anacostia, D C , and Moundsville. West Va., was recently made by Lieutenant Samuel P. Mills, pilot, and Lieut Van Meier, passenger One hundred pounds of photographic supplies, destined for Washington, were carried. Excellent weather was encountered, the round trip from McCook to Langley and return being made in about 10½ hours' flying time One unscheduled landing was made close to Cumberland on the return trip but no damage resulted.

Army Orders—Capt. Edgar P Sorensen, A.S , relieved from duty in the office C A.S , and from training at Scott Field, Ill , is assigned to McCook Field, Ohio, for duty and course of instruction at the Engineer School.

Maj. Frank M Kennedy, A S , relieved from duty at Scott Field, Ill., is assigned to Berlin and Friedrichshafen, Germany on duty to carry out the confidential instructions of the Secretary of War

First Lieut Edwin A Russell, A.S , found incapacitated for active service by an Army Retiring Board, his retirement is announced

Previous order assigning First Lieut Clarence H. Schabaker, A S , to Bolling Field, D C to duty, is amended to read "to Chanute Field, Ill.

First Lieut. William Turnbull, A S , relieved from his present duty at Scott Field, Ill , is assigned to follow a course of training as airship pilot in the Balloon and Airship School

First Lieut Paul Evert, A S , relieved from duties at Post Field, Okla. and Carlstrom Field, Fla., is assigned to the 12th Squadron (Obs.) for duty

Maj. Arthur R Christie, A S , relieved from his present duty as assistant military attache, Tokyo, Japan, is recalled to the United States.

Capt Walter Bender, A.S , relieved from duty at Kelly Field, Tex., is assigned to Brooks Field, Tex for duty and training in the Primary Training School

The transfer of First Lieut. Morton Donald Adams, Air Service, to the Coast Artillery Corps on July 11, 1922, with rank from July 1, 1920, is announced. He is relieved from his present duties at Carlstrom Field, Fla , and will proceed to Camp Eustis, Va , and will report in person to the commanding officer of that camp for assignment to duty The travel directed is necessary in the military service and is chargeable to procurement authority FD 43 P 2451 A 3

First Lieut. George H Brown, Air Service, now on duty at Chanute Field, Rantoul, Ill , will proceed to Fort Sheridan, Ill , and report in person to the commanding officer for observation and treatment at the station hospital. The travel directed is necessary in the military service and is chargeable to procurement authority QM 3730 P 159 A 3.

So much of paragraph 8, Special Orders, No 27—O, February 2, 1922, War Department, as directs First Lieut William A Gray, Air Service, upon completion of his present tour of foreign service, and upon arrival in the United States, to proceed to Langley Field, Hampton, Va , and report in person to the commanding officer for duty and airship training is amended so as to direct him, upon completion of his leave of absence, to proceed to Scott Field, Belleville, Ill , in time to report in person, on or before Sept. 20, 1922, to the commanding officer for duty and airship training The travel directed is necessary in the military service and is chargeable to procurement authority FD 35 P 2451 A 3 (A G 210,31) (7-27-22)

Capt Roland L Davis, Air Service, will proceed from Scott Field, Belleville, Ill , to Fort Sheridan, Ill , and report in person to the commanding officer for observation and treatment at the station hospital The travel directed is necessary in the military service and is chargeable to procurement authority QM 3730 P 159 A 3

First Lieut Frank M McKee Air Service will proceed from Scott Field, Belleville Ill , to Fort Sheridan, Ill , and report in person to the commanding officer for observation and treatment at the station hospital The travel directed is necessary in the military service and is chargeable to procurement authority QM 3730 P 159 A 3

Maj Thomas DeW Milling Air Service, is relieved from detail as a member of the board of officers appointed in paragraph 44, Special Orders, No 175 July 28 1922, War Department to prepare programs of instruction for General and Special Service Schools

First Lieuts Harry A Sutton and Bayard Johnson of the Air Service are relieved from their present duties at McCook Field Dayton Ohio, and will report in person to the commandant Engineering School, McCook Field, for duty and training in the engineering course commencing Aug 15, 1922.

Naval Aviation

Unsanctioned Photography—The Navy Department calls attention to some aerial photographic views of naval bases taken from airplanes by civilians have been taken without the authority of the commanding officers of Naval stations, especially one of the submarine base at Key West. Provisions of section one of Act of June 15, 1917 (40Stat., 217) are in full force and effect today according to a recent ruling of the Judge Advocate General of the Navy Among other things they provide that:

"Whoever for the purpose of obtaining information respecting the National Defense with the intent, or reason to believe, that the information to be obtained is to be used to the injury of the United States or to the advantage of any foreign nation, flies over, or otherwise obtains information concerning, among other things, any submarine base, or whoever for the purpose aforesaid, and with the intent or reason, makes or obtains or attempts or induces, or aids another to make or obtain any photographs or photographic negative of anything connected with the national defense, i.e. a submarine base, "shall be punished by a fine of not more than $10,000 or by imprisonment for not more than two years, or both "

Evidently permission of the local commandants are necessary before pictures may be taken of Naval bases.

The Advantages of an Amphibion—A naval airplane driving up to a village blacksmith shop and requesting minor repairs of the astonished blacksmith is an incident of a trip from Hampton Roads to Washington made recently by a Vickers "Viking" amphibian plane which has recently been delivered to the Navy Department for test work at Washington

The Vickers plane left Hampton Roads from the Naval Air Station on the morning of July 25 and headed overland for Washington, with Ensign Williams acting as pilot, and Lieutenant Roth as passenger When close to Gloucester, Va., minor engine trouble developed and it was considered advisable to make a landing The amphibian having the choice of land or water on which to come down settled in Mobjack Bay and then climbed up on shore. A small leak had developed in the engine and the services of the village blacksmith were readily secured When the trouble had been corrected the 'smith' refused to accept pay for his work. He said that he was glad to help the Naval pilots out in an emergency but with the advent of aircraft which could operate from land or water as the case might require, he had visions of changing the blacksmith shop into a service station for amphibian airplanes.

This Vickers amphibian was brought to this country recently by the Navy Department for test work in line with the general policy of keeping in touch with the latest and best developments in aircraft throughout the world as an aid and spur to American design and development This policy has been a boon to the industrial field of aeronautics in that it has enabled aircraft manufacturers in this country to keep in intimate touch with foreign design and workmanship.

During the next week, the Vickers will be under test at the Naval Air Station, Anacostia, for testing and investigation by Naval aviation experts.

* * *

Naval Orders—Ensign Trevor Lewis, det Nav Air Sta. Pensacola, Fla , to R Barracks, Hampton Roads, Va.

Lt. Comdr Riley F McConnell, det U S S Shawmut, to U S S Relief as executive officer

Lieut Edward L. Marshall (C E C), det Nav Air Sta Lakehurst, N J , to duty 4th Nav Dist.

Lieut Thomas J Shack (C E C), det 4th Nav Dist., to duty Nav Air Sta. Lakehurst, N. J

Lieut Byron J Connell, det Naval Air Station Coco Solo, C Z , to post-graduate course aeronautical engineering Naval Academy Annapolis, Md

* * *

Post Graduate Instruction at Annapolis—The following officers have been selected for post graduate instruction at Annapolis:

Ordnance—Lieut J E Ostrander, Torpedo Plane Squadron, Atlantic Fleet

Aeronautical Engineering—Lieut. B J Connell, Nav. Air Sta Coco Solo, C. Z.

Naval Aircraft Radio Development—Typewriting in the clouds in an airplane, while the ghostly hand of radio duplicates the letters on the keyboard at a station many miles away and the message is reeled off in print, has recently been accomplished in Navy Department tests at the Anacostia Naval Air Station

And this is the development which will give to Naval planes a means of communication in advance of the radio telegraph and radio telephone now in current use That such a development will be of incalculable value to all forms of aviation, commercial and military, follows inevitably on the heels of the work now being done by the Navy.

The business man of the future, on a hurried trip by air from New York to Chicago, will follow the market quotations as they are reeled off from the stock ticker carried in the plane as readily as though he were seated at his desk in Wall Street Passengers will be able to send messages from the air which are punched out on the key-board of an instrument in the plane and recorded automatically in stations located on the ground below, and the Navy is assured of a means of accurate communication between planes of the Air Fleet and battleships so essential to the close cooperation required in Fleet operations.

The teltype, which is the name of the device used in this means of communication, has been adapted to aircraft radio work by experts working in conjunction with officials of the Navy Department, and the success so far attained assures the practicability of the scheme in every detail

The sending instrument of the teltype is mounted in a standard type of Navy plane. It resembles in general the commercial typewriter in that a key-board having the letters of the alphabet and other conventional symbols on it is arranged so that it may be operated by hand Each key is connected to the radio installation in the plane and when a letter is struck on the key-board a radio impulse is sent out from the antennas of the plane and is received at a station on the ground. The similarity to the typewriter is completed in the equipment of the receiving end of the device. When, for example, the letter A is struck on the key-board in the air, the radioactive energy released travels to the recording instrument and selectively energizes the type-letter A, causing it to be reproduced on paper carried in the receiver

The teltype has been in use for eight years in connection with land wire operations, but its application to radio use is a recent development and the present tests now going on at the Naval Air Station are the first that have ever been conducted in aircraft. Within the past year successful tests were carried on with the teltype operated by radio between the Naval Air Station at Anacostia and the Bureau of Standards in Washington, a distance of nine miles. This laid the foundation for further work in connection with airplanes.

As the tests are carried on at present, the transmitting instrument of the teltype is mounted in the plane and the receiver is located on the ground at the station, but experts who are carrying on the work point out that a reversal of this operation, where the recording instrument is carried in the plane and messages are sent out to it from ground stations, is development merely involving detail As applied to the Navy, the radio teltype will be a great improvement over methods now in use for communication between ships and aircraft With the printed message reeled off on the receiver much of the chance for error will be eliminated This will be a marked step in advance, in that it will allow of explicit directions to scouting and combat planes in flight by the Commander-in-Chief of the Fleet and will enable scouts and other types of planes to convey accurate and detailed information to the high command.

The radio teltype is said by naval experts to be subject to the same static disturbances which are encountered in the radio telegraph Static interference is an element to be reckoned with in all phases of radio work and has never been entirely eliminated The Navy Department, it is said, has been engaged in research work looking to the elimination of static longer than any other government department, and while results have been attained which have reduced interference from this source to about half, it has never been completely removed.

Foreign News

Argentine—In order to develop the aviation branch of the Argentine Army and to provide at the same time an improved air service from the capitol to the smaller commercial centers, the Director of the Aeronautic Service has suggested the establishment of an aerial mail system by cooperation between the Ministry of War and the Direction General of Post Offices & Telegraphs, the Department of Commerce is advised by Vice Consul Houlahan, Buenos Aires.

The plan meets with the approval of the Ministry of War and the Postal Administration, but the latter has stipulated that the administration of the service in peace times shall be under the exclusive jurisdiction of the Post Office Department, since that branch of the government would be responsible to the public under ordinary conditions. The suggested route from Buenos Aires includes the cities of Azul, Bahia Blanca, Patagones, San Antonio Oeste, Rawson, Comodoro Rivadavia, Rio Gallegos, and Ushuaia

A joint committee is now preparing a detailed plan, including the schedule of deliveries, time of flights, mail capacity for each trip, charges, etc

* * *

Germany—Germany's commercial flying program for 1922 aims especially to develop connections with Russia and the Baltic border States, according to *Commerce Reports*

Among the most striking changes in this year's program are the abandoning of the air lines, Berlin-Braunschweig-Dortmund and Bremen-Muenster-Dortmund, because of the small demand for the services they offered against railway competition. From a purely business standpoint, aviation companies considered the 10 to 11 marks per air-kilometer flown paid by the Government for mail-carrying flights in 1921, as inadequate without the added revenue from sufficient passenger carrying

Out of 4781 air kilometers, included in Germany's 1922 air routes, 2268 km embraces routes connecting Hamburg and Berlin with the east—that is, via Stettin, Danzig, and Koenigsberg to Kovno, Riga, and Reval The above total does not include the air lines connecting seaside resorts—namely, the Hamburg-Westerland and the Bremen-Norderney—as these lines are preeminently pleasure routes that are run only from July 1 to Sept. 15

The important new connection between Koenigsberg and Moscow, opened on May 1, 1922, is also excluded. This is operated by a newly founded company, the German-Russian Air Transportation Co, participated in by the Russian Soviet Government and by the German Aero Union Aktien Gesellschaft The German Aero Union is promoted jointly by the Allgemeine Elektricitaets Gesellschaft, the Hamburg America Lines, and the Zeppelinbau Corporation Air connections between Berlin and Moscow are made twice a week The duration of the flight between Koenigsberg and Moscow is about one-half day, whereas it requires four and one-half days to make the journey by rail

The economic advantages of aerial transportation to and from Russia or the Baltic border States are obvious Transportation facilities in the eastern States are now in a most deplorable condition

The 1922 air lines now advertising are (1) Copenhagen-Hamburg-Berlin-Dresden; (2) Berlin Bremen; (3) Bremen-Hanover-Magdeburg-Leipzig-Dresden; (4) Berlin-(Hamburg)-Stettin-Danzig Koenigsberg-Kovno-Riga; (5) Danzig-Koenigsberg Memel-Riga; (6) Berlin-Leipzig-Fuerth (Stuttgart)-Munich-Augsburg; (7) Munich-Constance; (8) Hamburg-Westerland; (9) Bremen-Wangeroog-Norderney

Aviation insurance covering all classes of travelers in airplanes is procurable in Germany. The yearly rate for factory aviators and for students, on a 1,000-mark policy, is 50 marks for death Other aviators, such as sportsmen, teachers, pilots, observers, engineers, and passengers, take a 50-mark rate For individual flights, passengers pay 1 mark for distances up to 150 kilometers The rate increases with the distance up to 450 kilometers, for which 2.25 marks are payable on a 1,000-mark policy covering death The premium for invalidity is in most cases about half that for death

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